INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(54) Title: MEDICAMENT DISPENSING CONTROL WORKSTATION
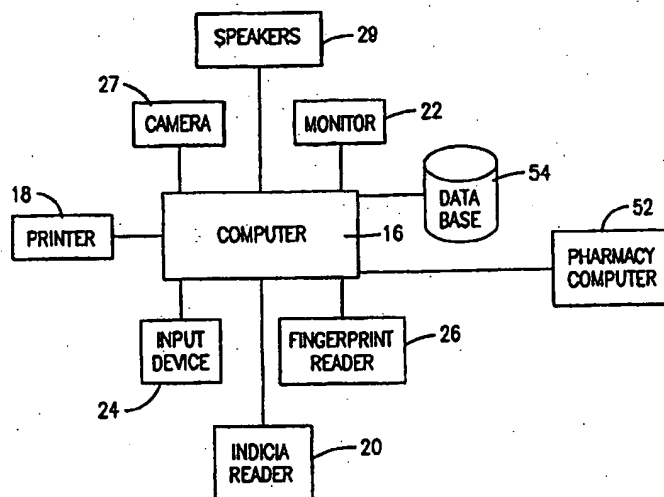
(57) Abstract

A medicament dispensing workstation (10) that effectively eliminates errors associated with the filling and dispensing of medicaments and that is compact, fully functional, and easy to use is disclosed. The workstation includes a computer (16) operable for accessing a prescription database for retrieving prescriptions therefrom; a printer (18) coupled with the computer and operable to print prescription labels; an indicia reader (20) such as a bar code reader coupled with the computer; a monitor (22) coupled with the computer for displaying certain prescription data thereon; an input device (24) such as a keyboard or keypad coupled with the computer for permitting manual entry of data therein; and a fingerprint reader (26) coupled with the computer for authorizing use of the workstation. The workstation may also include other components such as a digital camera (27) and speakers (29).

MEDICAMENT DISPENSING CONTROL WORKSTATION

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15 BACKGROUND OF THE INVENTION

1.   FIELD OF THE INVENTION

        The present invention relates to medicament dispensing systems. More particularly, the invention relates to a compact yet fully functional workstation for use in filling and dispensing medicaments such as prescription drugs.

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2.   DESCRIPTION OF THE PRIOR ART

        Pharmacists in many areas still manually fill and dispense prescriptions by reading a prescription ticket, manually locating a supply container of a medicament that fills the prescription, manually filling a vial or other package with medicaments from the

25   supply container and then printing and placing a prescription label onto the vial or package. Such manual prescription filling and dispensing methods occasionally lead to potentially serious errors. For example, pharmacists sometimes locate and use the wrong supply container to fill a prescription and thus dispense the wrong medicament. Similarly, pharmacists sometimes inadvertently switch the labels for two different

30   prescriptions and thus mislabel dispensed medicaments. Mislabeling errors are compounded by the fact that many pharmacists print labels for numerous different prescriptions at the same time and then later attempt to locate the proper label for a prescription from a pile of pre-printed labels.

        Automatic dispensing systems, such as the one disclosed in U.S. Patent

35   No. 5,337,919 (hereinafter referred to as the "'919 patent") have been developed to

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assist pharmacists in the filling and dispensing of medicaments. Although the system described in the '919 patent is extremely effective for both eliminating filling and dispensing errors and for increasing the efficiency of a pharmacy, it is sometimes too costly for small pharmacies or too large for small locations and limited to dispensing

5   medications that can be automated.

Portable prescription control computers have been developed for use by smaller pharmacies to organize the filling and dispensing of medicaments. However, these prior art portable systems either lack many components and features needed to prevent prescription filling and dispensing errors or are too large, cumbersome, and

10   difficult to use.

OBJECTS AND SUMMARY OF THE INVENTION

The present invention solves the above-described problems and provides a distinct advance in the art of medicament dispensing systems and methods. More

15   particularly, the present invention provides a medicament dispensing workstation that effectively eliminates errors associated with medicament filling and dispensing and that is compact, fully functional, and easy to use.

The workstation of the present invention broadly includes a computer operable to access a prescription database for retrieving prescriptions therefrom; a

20   printer coupled with the computer and operable to print prescription labels; an indicia reader such as a bar code reader coupled with the computer; a monitor coupled with the computer for displaying certain prescription data thereon; an input device such as a keyboard or keypad coupled with the computer for permitting manual entry of data therein; and a fingerprint reader coupled with the computer for verification purposes.

25   The workstation may also include other components such as a digital camera and speakers. The components of the workstation are all mounted in or coupled with a compact housing that easily fits on top of a small counter top or table.

An operator such as a pharmacist or pharmacist technician may use the workstation either as a stand-alone device or in conjunction with an automatic

30   medicament storing and dispensing apparatus. In both applications, the workstation first retrieves or is sent prescription data corresponding to a prescription to be filled from a pharmacy host computer. The monitor displays certain parts of the prescription data such as text information and/or an image of the medicament or product that fills the

prescription so that the operator can locate a supply container for filling the prescription. Once the supply container has been located, the operator scans container indicia on the supply container with the indicia reader, and the computer compares the scanned indicia to the prescription data to determine whether the proper supply container was retrieved.

5 If the wrong supply container was retrieved, the computer displays a warning on the monitor and prevents the printer from printing a prescription label for the prescription.

If, however, the proper supply container was located, the computer presents information regarding the prescription and text information and/or an image of the medication and then allows the operator to prompt the printer to print a prescription

10 label for placement on a vial or package filled from the supply container. The operator then places the label on the vial or package and scans the prescription label with the indicia reader to verify that the proper medicament has been placed in the vial or package. During the verification scan, the monitor displays a graphic image of the prescribed medicament and information relating to the prescription so that the operator

15 may compare the medicament in the vial or package to the graphic image and the other displayed prescription information to verify that the proper medicament has been placed in the vial or package.

The computer and printer are also configurable to add additional controls to prevent mislabeling of vials and packages. Specifically, the computer and printer are

20 configured to discard or otherwise prevent access to a printed prescription label that is not retrieved from the printer within a predetermined amount of time. The computer and printer also discard or otherwise prevent access to a printed prescription label if an operator attempts to fill another prescription with the workstation before the prescription label has been retrieved from the printer or the active prescription is completed. This

25 prevents an operator from pre-printing numerous prescription labels before the labels are applied to the appropriate vials or packages and therefore eliminates confusion as to which label should be applied to a vial or package.

These and other important aspects of the present invention are described more fully in the detailed description below.

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BRIEF DESCRIPTION OF THE DRAWING FIGURES

A preferred embodiment of the present invention is described in detail below with reference to the attached drawing figures, wherein:

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Fig. 1 is an isometric view with parts broken away of a medicament dispensing workstation constructed in accordance with a preferred embodiment of the present invention and depicting the workstation in its fully opened position.

Fig. 2 is a side elevational view of the workstation with certain components
5   shown in section and other components depicted in dashed lines.

Fig. 3 is a side elevational view of the workstation with parts broken away depicting the workstation in its fully closed position.

Fig. 4 is a block diagram of certain components of the workstation.

Fig. 5 is an isometric view of the workstation shown in use with an
10   automatic medicament storing and dispensing apparatus.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to the drawing figures, and particularly Fig. 1, a medicament dispensing control workstation 10 constructed in accordance with a preferred
15   embodiment of the invention is illustrated. The workstation is configured for use by an operator to assist in the filling and dispensing of prescriptions for medicaments and other products. The operator may be a pharmacist, a pharmacy technician, or any other authorized person. The workstation may be used as a stand-alone device or may be used in conjunction with an automatic medicament storing and dispensing apparatus
20   such as the apparatus 12 illustrated in Fig. 5 or the SP 200 manufactured and sold by ScriptPro LLC of Mission, Kansas. Operation of the workstation for both of these applications is described below.

As best illustrated in Figs. 1 and 4, the workstation 10 broadly includes an outer housing or enclosure 14, a computer 16, a printer 18, an indicia reader 20, a
25   monitor 22, one or more input devices 24, and a fingerprint reader 26. The workstation may also include other components such as a digital camera 27 and speakers 29.

In more detail, the housing 14 encloses and/or supports other components of the workstation 10 and, as best illustrated in Fig. 1, includes a front wall 28, a rear wall 30, a left side wall 32, and a right side wall 34 that together define an open-top interior
30   chamber. The housing may be formed of any suitable material such as aluminum or plastic and is approximately the size of a conventional personal computer so that it easily fits on top of a small counter top or table.

The front wall 28 of the housing 14 includes an opening communicating with the interior chamber for receiving a sliding drawer 36 that holds the input device 24. A transparent window 38 (Fig. 5) is also formed in the front wall for providing access to the indicia reader 20 as described below. The front wall preferably includes a

5   horizontally hinged panel or door 40, having a label slot or port 42 therein for discharging printed prescription labels from the printer 18 to an operator operating the workstation. The panel 40 can be manually shifted between opened (Fig. 2) and closed (Fig. 3) positions to provide access to the interior chamber of the housing as described below.

The left and right side walls 32, 34 of the housing 14 each include a pair

10   of spaced-apart panels 44, 46 and 48, 50 defining an open area therebetween. The open areas accommodate operation of mechanism for shifting the hinged panel 40 and the monitor 22 between open and closed positions as described in more detail below.

The computer 16 controls the other components of the workstation and communicates with a pharmacy host computer 52 (Fig. 4) for retrieving prescription data

15   therefrom. The computer may be any computing device such as a central processing unit (CPU) of a conventional personal computer or a custom programmed PLC or processor. The pharmacy host computer may be any computer running a pharmacy prescription dispensing management program such as those provided by QS/1 Pharmacy Computer System Software. The computer 16 is configured to access one

20   or more databases 54 such as an attribute database containing information relating to medicaments that are to be dispensed and a prescription database containing prescription data and information. This attribute database preferably includes graphic images of medicaments as well as other identifying information. The databases may reside in either the computer 16 or the pharmacy computer 52 or may be stored in

25   memory separate from but accessible by either the computer or the pharmacy computer.

When the workstation 10 is used as a stand-alone device, it includes its own separate computer 16 that communicates with the pharmacy host computer 52. When the workstation is coupled with an automatic medicament storing and dispensing system 12 such as the one illustrated in Fig. 5, it may not include its own separate

30   computer, but may instead be coupled with the computer running the medicament storing and dispensing system. Such an automatic storing and dispensing system is described in co-pending patent application entitled Automatic Dispensing System for

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Unit Medicament Packages, Serial No. 09/457,286, filed December 8, 1999, hereby incorporated into the present application by reference.

The printer 18 is coupled with and controlled by the computer and is preferably positioned within the interior chamber of the housing 14. The printer is
5   preferably a label-type printer and is described in more detail in co-pending patent application entitled Label Printing Assembly For Use With a Medicament Dispensing Control Workstation, Serial No. _____, filed March 29, 2000, hereby incorporated into the present application by reference. The label printer includes a label peeler assembly 56 that communicates with the label slot 42 in the hinged panel 40 to
10   discharge printed prescription labels therefrom.

The indicia reader 20 is coupled with the computer 16 and is also preferably positioned in the interior chamber of the enclosure 14. The indicia reader is preferably a conventional bar code scanner or reader operable to read bar code labels or other indicia and codes from items that are passed over the transparent window 38
15   in the enclosure front wall 28.

The monitor 22 is coupled with the computer 16 and is preferably mounted to the enclosure so that it can be shifted between a lowered, forward position illustrated in Fig. 3 and a raised, rearward position illustrated in Figs. 1 and 2. When in its lowered position, a cover panel 58 mounted adjacent the monitor covers the open top of the
20   enclosure to prevent access to the label printer and other components housed in the enclosure. Conversely, when the monitor is shifted to its raised position, the monitor and cover panel are shifted rearward away from the open top of the enclosure to permit access to the label printer and other components within the enclosure. The monitor is preferably a flat screen-type computer monitor.

25   The monitor 22 is hingedly attached to the enclosure 14 by a pair of pivotally mounted L-shaped brackets 60, 62. The lower end of each bracket is coupled with a pneumatic cylinder 64, 65 that has one end fixed to the enclosure. The pneumatic cylinders maintain the position of the monitor after it has been shifted to either its raised or lowered positions.

30   A pair of spring-tensioned rods 66, 68 are connected between the hinged panel 40 and the lower end of each bracket 60, 62. When the monitor 22 is manually shifted to its raised position (Figs. 1 and 2), the brackets extend the rods to open the

hinged panel. Conversely, when the monitor is shifted to its closed position (Fig. 3), the brackets retract the rods to close the panel.

The workstation 10 also includes mechanism that maintains the monitor in an upright, viewable position as it is shifted between its raised and lowered positions.

5 Specifically, the mechanism includes a sprocket 70 rotatably mounted to the lower end of each bracket, a sprocket 72 rotatably mounted to the upper end of each bracket, and a chain or belt 74 trained across the sprockets. The upper sprockets are mounted to a shaft 76 that is fixed to the monitor casing by a slip clutch. When the monitor is shifted between its raised and lowered position, the sprockets and chain act as a four-bar

10 linkage to maintain the upright orientation of the monitor so that it can always be easily viewed. The slip clutch coupled with the top sprocket allows the orientation or angle of the monitor to be manually adjusted.

The input device 24 is coupled with the computer 16 and is preferably positioned within the drawer 36 that slides in and out of the enclosure 14. The input

15 device is preferably a conventional keyboard and/or keypad. The fingerprint reader 26 is also coupled with the computer and may be positioned in the drawer or elsewhere on or in the enclosure.

The optional digital camera 27 may be provided for teleconferencing purposes and is preferably positioned either on top of the monitor or on one of the side

20 walls of the enclosure. The optional speakers 24 are provided for sounding certain warning messages as described below and may be internally or externally mounted relative to the enclosure.

Operation

As mentioned above, the workstation 10 may be used as a stand-alone

25 device or may be used in conjunction with an automatic medicament storing and dispensing apparatus 12. When used alone, a prescription filling and dispensing procedure is initiated when the computer 16 retrieves or is sent prescription data corresponding to a prescription that needs to be filled from the pharmacy host computer 12. The computer accesses the databases 54 and displays on the monitor 22 certain

30 information relating to the prescription to be filled such as the type of medicament or product that fills the prescription, an image of the medicament or product, the prescribed quantity of the medicament, the doctor's name, and the patient's name.

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The operator reads the information from the monitor 22 and then retrieves a supply container containing the medicament needed to fill the prescription. Each supply container has a bar code or other indicia printed thereon which includes data representative of the medicament or product therein. The bar code on each supply

5   container or package is preferably a UPC code corresponding to the national drug code (NDC) or the drug identification number (DIN) of the medicament or product. The operator passes the bar code label or other container indicia on the supply container over the transparent window 38 of the indicia reader 20 so that the indicia reader can read the container indicia and send information relating thereto to the computer 16. If

10   the bar code or other indicia on the supply container or package is scratched or otherwise unreadable, the operator may manually enter such information into the computer via the input device 24.

The computer 16 compares the indicia read from the supply container or package to the prescription data for the prescription currently being filled to determine

15   a match. If the indicia on the supply container does not match or correspond to the prescription data, the computer provides a visual and/or audio error message to the operator via the monitor 22 and/or the speakers 29 to instruct the operator that the wrong supply container has been retrieved. The computer also prevents the printer from printing a prescription label.

20   If, however, the operator retrieved the correct supply container, the computer 16 prompts the operator to fill a vial or package with the medicament from the supply container according to the prescription data. The computer then allows the operator to prompt the printer 18 to print a prescription label corresponding to the prescription and instructs the operator to place the prescription label on the vial or

25   package to be delivered to the patient.

To verify that the proper medicament has been placed in the vial or package and that the proper label has been placed on the vial or package, the operator must perform a verification scan. Specifically, the operator is instructed to scan the prescription label placed on the vial or package by passing the vial or package over the

30   transparent window 38 of the indicia reader 20. In response, the computer 16 displays on the monitor 22 a graphic image of the medicament that corresponds to the prescription label and other information relating to the prescription such as the patient's name and the doctor's name. This allows the operator to compare the medicament in

the vial or package to the graphic image of the medicament on the computer monitor to ensure that the proper medicament has been placed in the vial or package.

During or after the verification scan, the operator must enter a unique PIN number associated with the operator or must place his or her fingerprint in the fingerprint

5   reader 26 so that the computer 16 may authorize the operator and record which operator dispensed the vial or package. This ensures that only authorized operators can operate the workstation and also forces operators to accept responsibility for vials or packages as they are dispensed to patients.

When the workstation 10 is used with an automatic medicament storing

10   and dispensing apparatus 12 such as the one illustrated in Fig. 5, pre-packaged products or vials are delivered to the operator by the apparatus in response to prescriptions from the pharmacy computer 52. The operator must scan a product or vial that has been dispensed by the apparatus 12 to determine that it matches the prescription in the same manner that the operator scans the supply container in the

15   application described above. All subsequent steps are identical.

The computer 16 and the printer 18 are also configured to prevent mislabeling of a vial or package so that the wrong vial or package is not dispensed to a patient. Specifically, after a prescription label has been printed, the computer directs the printer to retract or otherwise make the label unavailable to the operator if the

20   operator has not taken the label from the printer within a predetermined amount of time. This time period may be selected by the operator but is preferably approximately 30 seconds. The computer may display on the monitor a countdown of the time remaining before a label is retracted to alert the operator that a label is about to be retracted.

Similarly, if an operator attempts to fill a new prescription with the

25   workstation 10 before a printed prescription label for a previous prescription has been retrieved from the printer, the computer 16 will direct the printer 18 to retract the previous prescription label so that it cannot inadvertently be placed on a vial or package used to dispense the later-filled prescription. After an operator attempts to fill a new prescription, the computer may warn the operator to retrieve and apply the label for the previous

30   prescription before the printer retracts the old label.

Although the invention has been described with reference to the preferred embodiment illustrated in the attached drawing figures, it is noted that equivalents may be employed and substitutions made herein without departing from the scope of the

invention as recited in the claims. For example, although the drawing figures and specification illustrate and describe a preferred embodiment of the workstation, the particular shape, size, and components used in the workstation may change without departing from the scope of the invention.

5   Having thus described the preferred embodiment of the invention, what is claimed as new and desired to be protected by Letters Patent includes the following:

CLAIMS:

1. A medicament dispensing control workstation for use in filling a prescription for a medicament, wherein prescription data corresponding to the prescription is stored in a database, the apparatus comprising:

5   a computer operable for accessing the database for retrieving prescription data therefrom corresponding to the prescription to be filled;

a printer coupled with the computer and operable to print a prescription label representative of the prescription;

an indicia reader coupled with the computer and operable to read container
10   indicia on a supply container of a medicament, the container indicia being representative of medicament contained in the container;

the computer being further operable to compare the container indica read by the indicia reader to the prescription data; and

the computer being further operable to prompt the printer to print the prescription
15   label only if the computer determines that the prescription data corresponds to the container indicia.

2. The workstation as set forth in claim 1, the computer being further operable to direct the printer to prevent a person from retrieving the prescription label
20 if the prescription label is not removed from the printer within a predetermined amount of time.

3. The workstation as set forth in claim 1, the computer being further operable to direct the printer to prevent a person from retrieving the prescription label
25 if a person attempts to use the workstation to fill another prescription before the prescription label is removed from the printer.

4. The workstation as set forth in claim 1, further including a monitor coupled with the computer for displaying the prescription data thereon.
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5. The workstation as set forth in claim 4, further including hinged mechanism coupled with the monitor for permitting the monitor to be shifted between a lowered position and a raised position.

6. The workstation as set forth in claim 1, further including an input device coupled with the computer for permitting manual entry of data.

7. The workstation as set forth in claim 1, further including a fingerprint
5   reader coupled with the computer for analyzing a person's fingerprint for verification purposes.

8. A method of filling a prescription for a medicament, the method comprising the steps of:

10   retrieving a supply container of medicament corresponding to the prescription;

        scanning a machine-readable container indicia on the supply container with an

                indicia-reading device to read container data representative of the

                container indicia;

        comparing in a computer the container data to prescription data corresponding

15   to the prescription to be filled;

        if the container data matches the prescription data, prompting with the computer

                a printer to print a prescription label representative of the prescription;

        preventing a person from retrieving the prescription label if the prescription label

                is not removed from the printer;

20   placing medicament from the supply container into a package; and

        applying the prescription label to the package.

9. The method as set forth in claim 8, the preventing step including the step of preventing a person from removing the prescription label from the printer if the
25   prescription label is not removed from the printer within a predetermined amount of time.

10. The method as set forth in claim 8, the preventing step including the step of preventing a person from removing the prescription label from the printer if a person attempts to fill another prescription before the prescription label is removed from
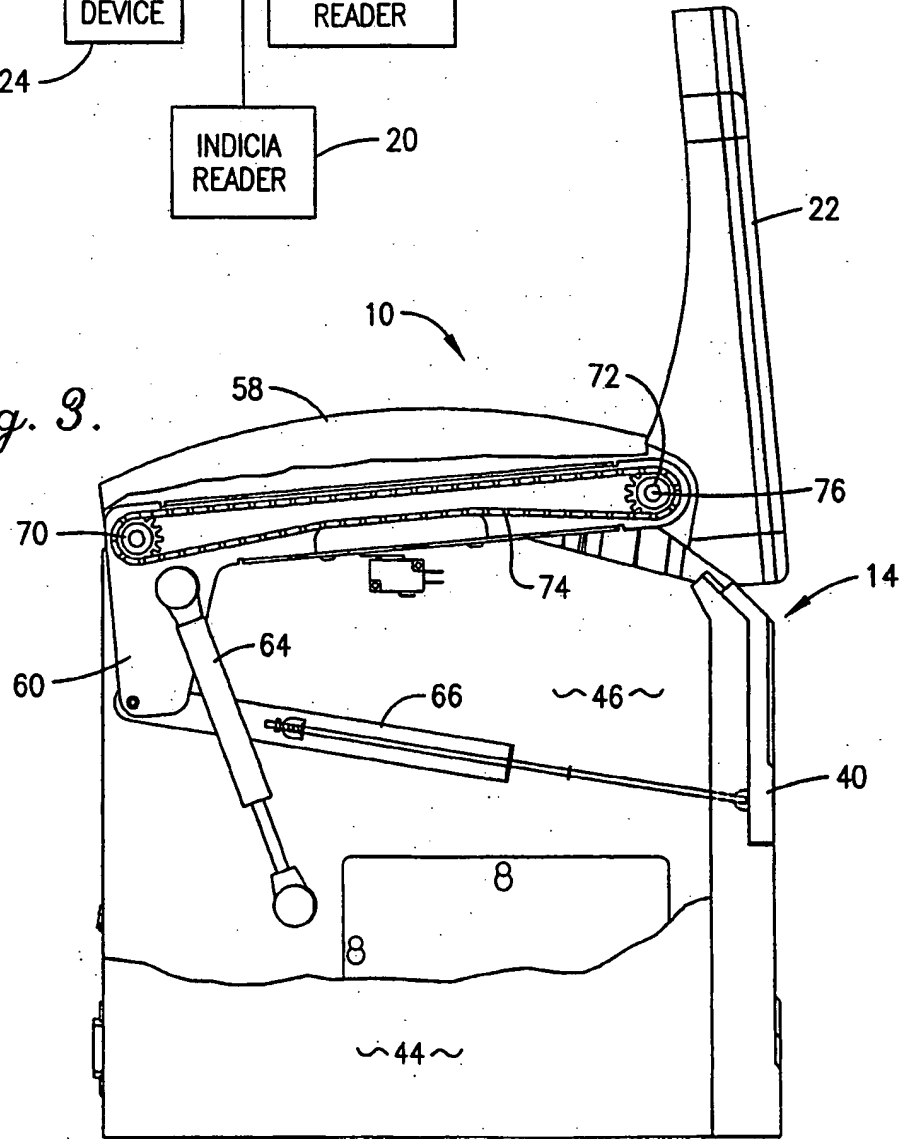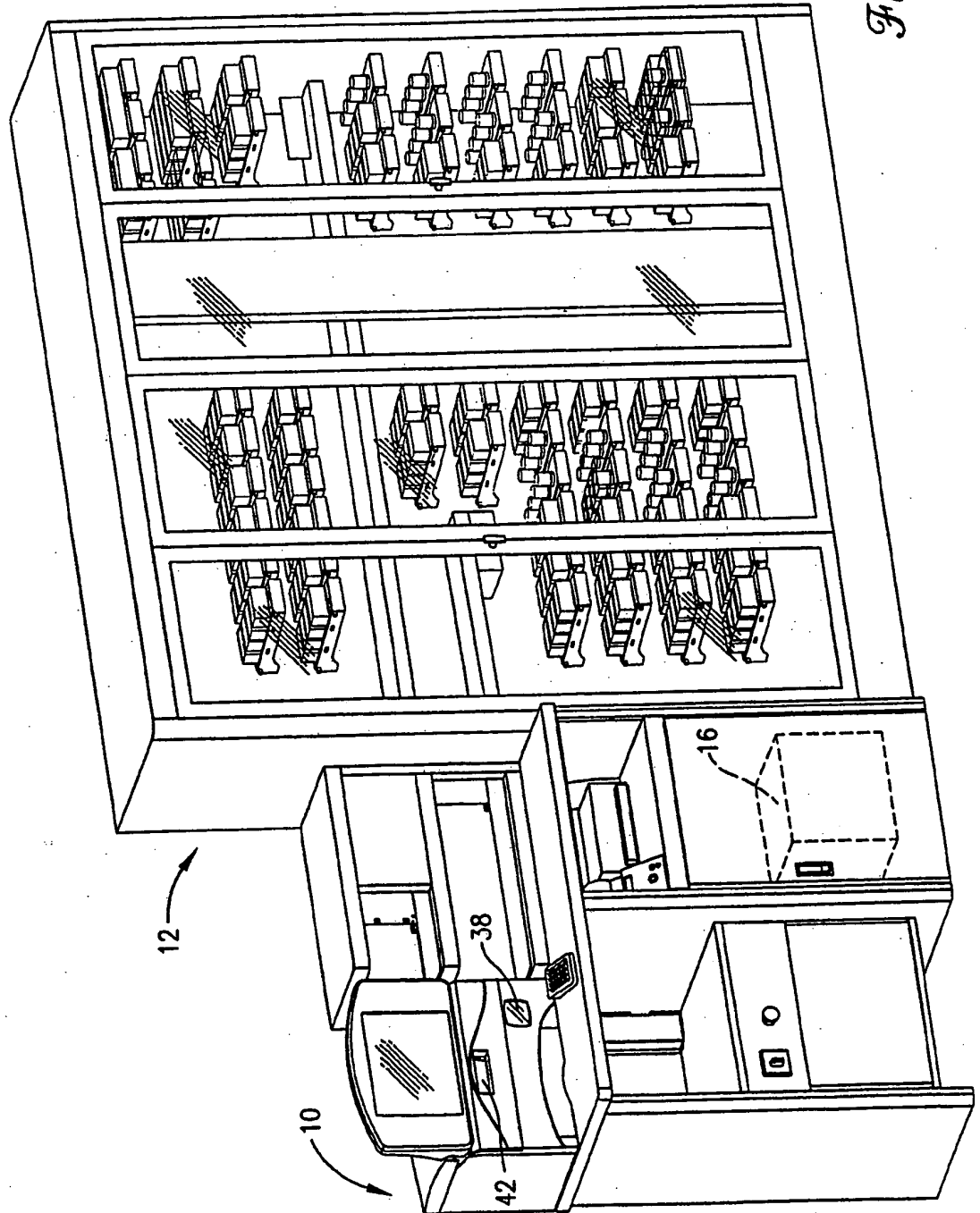30   the printer.

Fig. 1.

Fig. 2.

Fig. 4.
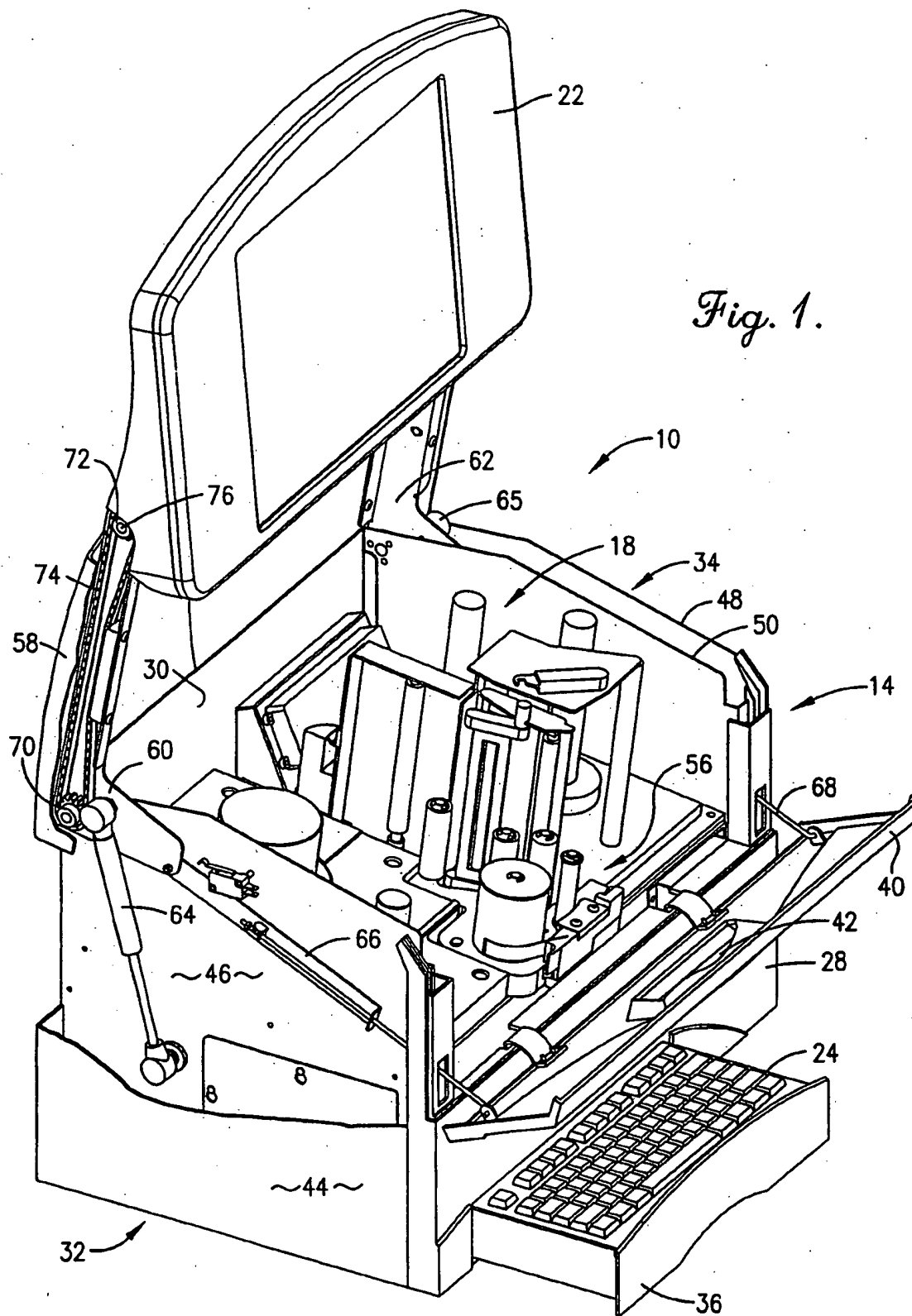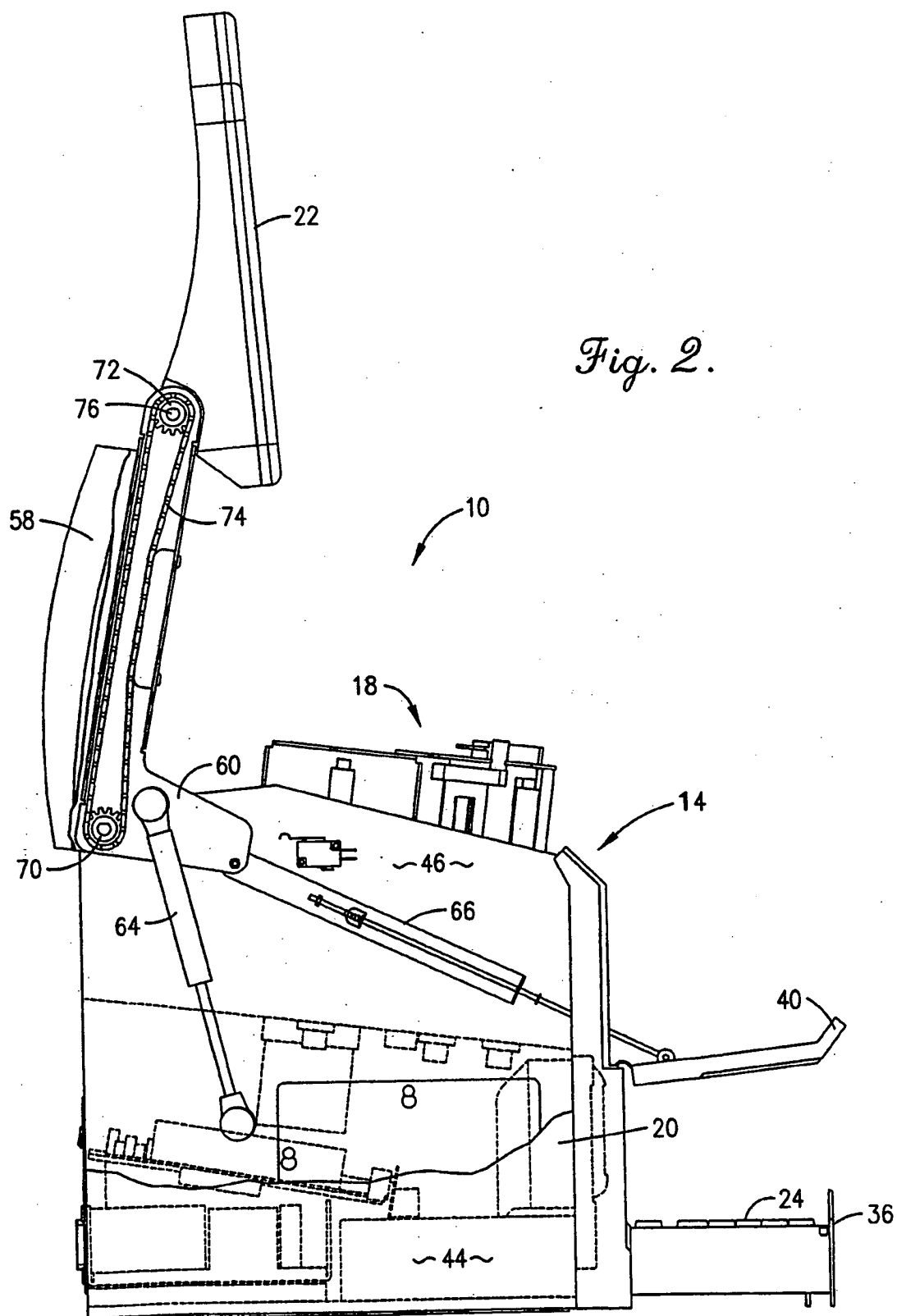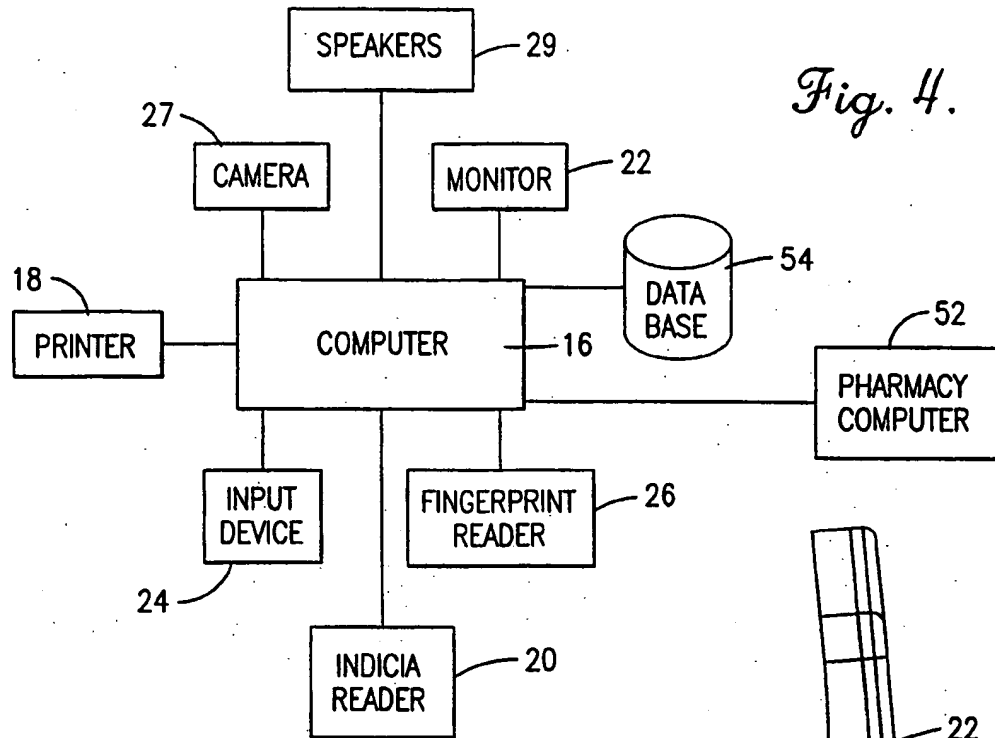
Fig. 3.

Fig. 5.

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7)   :G06F 7/00

US CL   :700/235, 216

According to International Patent Classification (IPC) or to both national classification and IPC

B.   FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. :   700/235, 216

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C.   DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 5,963,453 A (EAST) 05 October 1999, see entire document.	1 and 8
A	US 5,348,061 A (RILEY et al.) 20 September 1994, see full document.	
A	US 5,771,657 A (LASHER et al.) 30 June 1998, see full document.	
A	US 5,797,515 A (LIFF et al.) 25 August 1998, see full document.	
A	US 5,812,410 A (LION et al.) 22 September 1998, see full document.	
A	US 5,883,370 A (WALKER et al.) 16 March 1999, see full document.	

[X] Further documents are listed in the continuation of Box C.   [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 MAY 2000	**06 JUN 2000**

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/08270

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 5,907,493 A (BOYER et al.) 25 May 1999, see full document.	
A, P	US 6,036,017 A (BAYLISH, IV) 14 March 2000, see full document.	
A, P	US 6,036,812 A (WILLIAMS et al.) 14 March 2000, see full document.	